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### Recommended Citation

Munguti, Nzoya, Moses Mokuu, Rick Homan, and Harriet Birungi. 2006. "Cost analysis of reproductive health services in PCEA Chogoria Hospital, Kenya," FRONTIERS Final Report. Washington, DC: Population Council.

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**COST ANALYSIS OF REPRODUCTIVE HEALTH  
SERVICES IN PCEA CHOGORIA HOSPITAL, KENYA**

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June 2006

This study was funded by the U.S. AGENCY FOR INTERNATIONAL DEVELOPMENT (USAID) under the terms of Cooperative Agreement Number HRN-A-00-98-00012-00 and Population Council subaward AI04.42A. The opinions expressed herein are those of the authors and do not necessarily reflect the views of USAID.

## SUMMARY

**Background:** Presbyterian Church of East Africa (PCEA) Chogoria Hospital is a faith based non-governmental organization providing a wide range of healthcare services. The organization faces a number of challenges related to sustainability: declining donor support (especially for reproductive health services), low cost recovery levels, and increasing poverty levels among its clientele. In response to these concerns, a team from Chogoria Hospital attended a one-week workshop held in Ghana on financial sustainability and developed a small scale operations research project to determine the cost of providing a selected number of reproductive health (RH) services and to evaluate their cost recovery levels. The results of this assessment will guide the management in the setting of appropriate prices for RH services in the hospital.

**Methodology:** Data was collected on costs and prices as well as on revenues for maternity (including normal delivery, caesarean delivery and postabortion care) and maternal child health, (specifically, family planning, antenatal care, prevention of mother to child transmission (PMTCT) and voluntary counseling and testing (VCT) for HIV/AIDS). Costs assessed for these services were categorized into fixed and variable. Fixed costs included labor time and capital (buildings and equipment) while variable costs included drugs and medications, and supplies/materials. Total average variable and fixed costs were computed for each service and were compared with current prices to establish the cost recovery levels. The gap between average variable cost and current price indicates whether the service generates a net loss or can help offset the fixed costs of service provision.

**Results:** The fees currently charged for RH services do not cover the costs of providing the services. The cost recovery level across the nine RH services evaluated was 80.3% in FY 2004 implying that the hospital is experiencing losses on reproductive health service delivery. The deficit is most pronounced for the family planning visits (cost recovery 7-8%). For inpatient services Chogoria Hospital recovered 95.3% of its costs. For outpatient reproductive health services, Chogoria Hospital recovered 36.7% of its costs. Antenatal care recovered 101%. For the hospital to continue providing family planning, VCT and PMTCT services, the cost of production needs to be reduced and/or revenues from these or other services need to increase.

**Discussion:** The provision of RH services is not sustainable under the current cost and revenue structure. Measures to be explored to improve sustainability include increasing fees, cost containment, cross subsidization from other services, and negotiation of reimbursement from the national health insurance fund.

## **I. BACKGROUND**

PCEA Chogoria Hospital was started in 1922. The ownership of the hospital was transferred from the Church of Scotland to the Presbyterian Church of East Africa (PCEA) in 1956, when its name changed to PCEA Chogoria Hospital. The hospital runs a network of 32 outreach clinics; twenty of these clinics are fully managed by the hospital, 10 by area health committee members with support from the hospital, and one by the Ministry of Health (MOH).

In the 1970s, Chogoria Hospital introduced satellite primary care dispensaries in the remote parts of its service area. Each dispensary at that time enjoyed a monopoly of providing modern health care services. Today the situation has changed. Within the area served by Chogoria dispensaries and community health volunteers, are now three other hospitals, nine health centres and at least 165 dispensaries and clinics. This combined with increased poverty levels and escalating cost of living has contributed to low utilization of both outpatient and inpatient services in the hospital. In response, the hospital is using marketing and research to identify client-friendly solutions that improve access to and utilization of health services.

Currently the hospital has a bed capacity of 312, including 52 maternity beds. The average length of stay (ALOS) for all inpatient conditions is nine days, while that of maternity is five days. Total deliveries have declined by 41 percent between 1998 and 2002 from 2,038 to 1,213. The outpatient levels for the general hospital were 44,113 in 2001 and 48,194 in 2002. The increase was attributed to a general reduction of drug prices that were, however, not informed by an analysis of total cost of the drugs as a component of overall service costs. Reproductive health service visits system-wide were 847,385 inclusive of condom distribution. Condom-only visits totaled 733,810 or 86.5% of reproductive health visits in 2002. The high volume of clients for RH warrants a closer look at the attendant costs and pricing of those services (PCEA Chogoria, 2000, 2001 & 2002).

A recent study carried out by the hospital to determine perceived quality and barriers to service in the hospital identified costs and prices as major stakeholder concerns (Kimonye, 2002). The rural people considered hospital services, including RH, generally overpriced and a barrier to accessing health services. On the other hand, the hospital unit heads considered prices charged to be below cost (Musau et al., 1998 & 1999). Indeed, over the period 2001- 2002, the hospital experienced a 78 percent drop in net revenues. The hospital management attributed this partly to general under-pricing of health services. However, the management could not identify the specific services that were under-priced and to what extent. Additionally the team had no skills to assess its costs to determine its break-even level by service. Overall, cost recovery levels of the hospital were at 80 percent for a few years before 2004, implying a 20 percent recurrent deficit annually. A review of financial records in the hospital shows that there is no data available on cost recovery levels for specific services. This raises issues of sustainability, particularly for reproductive health services for which the hospital is estimated to be over 80 percent dependent on donor funding. Prior to this study, information on costs of providing RH services in the hospital was virtually unavailable, which rendered the current pricing practices inappropriate. This study endeavors to provide this information with a focus on reproductive health services.

The donors who have traditionally financed hospital RH services are pulling out. Chogoria has not developed an appropriate strategy for managing the transition. This situation is exacerbated by lack of cost information for reproductive health services. Service cost information will also be essential for approaching non-traditional donors to request additional funds.

The Kenya Government is undertaking a number of health sector reforms with far reaching implications for financing health services. The National Health Insurance Fund (NHIF) is reviewing its payments to providers. The fund will reimburse health providers on an average cost basis. To be reimbursed, providers will have to have accurate cost information. Currently, Chogoria lacks this information. Results from the study will help fill the gap as well as assist Chogoria Hospital to negotiate with other financiers, including donors and the Government.

*Research objective:* The overall objective of this study was to improve the financial sustainability of reproductive health services in the hospital. The specific objectives were to determine the: 1) total cost of providing selected RH services, 2) average cost of providing selected RH services; and 3) estimated cost recovery levels for reproductive health services.

## II. METHODS

*Design:* The study collected cost, price and revenue data from the hospital maternity ward and the MCH/FP clinic. Services evaluated in the maternity ward included normal delivery, caesarean section, and postabortion care. The MCH/FP clinic services examined include family planning, antenatal care, PMCT and VCT. The selection of these services was based on high volume, high-perceived costs and/or seriousness of the results of denying services. Normal deliveries and antenatal care were considered as routine high volume services, while caesarean section and postabortion care (PAC) were selected due to their contribution to reduced mortality and morbidity as well as relative high cost. The assessment of costs was conducted from the perspective of the provider (i.e., hospital).

*Procedure:* Costs were categorized into fixed and variable costs (Roberts et al., 1999). Variable costs included drugs, laboratory tests and other medical supplies, while fixed costs included personnel, equipment, utilities, maintenance and repairs, transport and buildings. Total costs are the sum of variable and fixed costs. In this assessment, prices for each of the nine services under review were compared with both average variable and average total costs to establish the amount of cost recovery.

Methods used to collect cost information from the maternity ward (inpatient services) and the MCH/FP clinic (outpatient) included observation, key informant interviews, and review of administrative records. Annex 1 presents a summary of resource requirements, data sources, and collection methods for this study.

Observation was used to obtain data on provider time use. Service providers, mainly doctors, the hospital matron and sisters-in-charge were interviewed using a short structured interview guide to develop a checklist of all resource inputs used to provide each service under review. Financial records (budgets, staff payrolls, expenditure returns, asset registers and price lists) were reviewed to generate information on fixed and variable costs. Additional data gathered included workload

statistics from service registers kept by the hospital (e.g. number of antenatal visits, number of in-patient days during pregnancy, number of laboratory tests, caesarean procedures).

*Analysis:* We estimated the total variable and total fixed costs for providing a service in which, a three-step process was used to estimate total cost for each service: 1) identification of all resources used to provide services (including classification as fixed or variable), 2) measuring resources used in their natural units (i.e., quantification), and 3) valuing resource items. By multiplying (2) times (3) the total cost for a resource was estimated. By adding up resources within the fixed and variable categories, the total fixed and variable costs for each service were estimated. (Drummond et al., 1997).

For purposes of making cost allocation decisions, costs were classified as either “joint” or “non-joint.” The latter are costs of resources used only for one client and include variable costs like drugs and materials. Non-joint costs were allocated 100 percent to the service in which they are incurred. Joint costs are resources used by more than one client and include: provider salaries, ancillary department costs (pharmacy, laboratory, and diagnostic imaging), administrative costs, equipment, utilities, space, furniture, maintenance, and transport (Janowitz & Bratt, 1994). They were allocated using either the proportion of workload (visits, or patient days) or the proportion of space devoted to the service.

Because services provided in the maternity ward and outpatient clinic lead to utilization of other services (pharmacy, laboratory, and diagnostic imaging), a portion of the revenues earned by these departments was included as ancillary revenue in the calculations.

After estimating the average total and average variable costs for the target services, current charges and ancillary revenues earned for each service were compared to these costs to establish the financing gap. The difference between average total cost and current revenue represents the portion of average fixed and variable costs that remains uncovered by user fees.

### III. RESULTS

*Cost of RH Services and Cost Recovery:* The costs of providing maternity and MCH/FP services and their respective cost recovery levels are presented in Table 1 below. The overall costs of providing these services exceed the revenues collected per service. The cost recovery level for the nine RH services evaluated is estimated at 80%. In-patient services cover approximately 95% of costs, with cesarean sections and postabortion care generating net income. Because inpatient costs were allocated on the basis of patient days, there is no difference in the average cost per day across the three inpatient services. In contrast, outpatient services cover only 37% of costs, with only the ANC services generating net income (about 3 KSh. or US\$ 0.04 per visit).

Among the outpatient services evaluated, family planning services have the lowest cost recovery levels (average of 7.5% of total costs). This is due to two factors, the higher total costs per visit due to the provision of family planning commodities coupled with the lack of any co-payment for family planning commodities whose costs are absorbed by a donor. This limited revenue means that family planning services cannot be financially sustainable and will require cross-subsidization from other services or continued donor support.

The hospital is able to recover only 34% of VCT costs. The shortfall is due to low fees at the point of service and the high cost of service provision due to the labor-intensive nature of counseling services (labor accounts for 82% of total visit costs).

PMTCT services are fully supported by donors and there are no fee charges for this service, except for revenue earned from ancillary services, so only about 28% of costs are recovered. As with VCT and FP this implies that Chogoria will remain dependent upon donor support to bridge the gap for these services.

**Table 1: Cost Analysis of Maternity and MCH/FP Services and Cost Recovery Levels**

(1) Services Evaluated	(2) Annual Volume of Service Provided <sup>1</sup>	(3) Current Fees per Service (KSh.) <sup>2</sup>	(4) Ancillary Fees Paid per Service (KSh.) <sup>3</sup>	(5) Average Total Cost per Service (KSh.) <sup>4</sup>	(6) Percent of Costs Recovered <sup>5</sup>
1. Maternity services:					
Normal Delivery	6,165	800	355	1,422	81.2%
Cesarean Sections	3,050	1,400	355	1,422	123.4%
Post Abortion Care	80	1,098	355	1,422	102.2%
<i>All Inpatient RH Services (weighted average)</i>					95.3%
2. MCH/FP Services:					
FP- 1 <sup>st</sup> visit	1,625	25	16	497	8.3%
FP- Revisits	2,746	25	16	559	7.4%
ANC- 1 <sup>st</sup> Visit	1,411	25	197	219	101.4%
ANC- Revisits	3,795	25	197	219	101.4%
VCT – 1 <sup>st</sup> Visit	1,770	25	89	330	34.5%
PMTCT	1,411	0	92	335	27.5%
<i>All Outpatient RH Services (weighted average)</i>					36.7%
<i>All RH Services Provided in FY 2004 (weighted average)</i>					<b>80.3%</b>

US\$1.00 = 70 Ksh. in 2006

1 Bed day of care for maternity services and outpatient visits for MCH/FP services

2 This is what the hospital is currently charging per unit of service: maternity services are charged per bed day while MCH/FP services are charged per visit.

3 This is the estimated average fee paid by clients of the maternity and MCH/FP services for pharmacy, laboratory, and diagnostic imaging services.

4 This is computed as total costs divided by annual volume of service provided in FY 2004. This is the fee that would need to be collected from each client in order for the service to break-even. In most cases, this would be a substantial increase over the fees currently collected (column 3 + column 4).

5 The cost recovery percentage is computed as expected revenue per service (column 3 + column 4) divided by average costs per service (column 5).

## IV. CONCLUSIONS

The analysis of costs and revenue streams for providing MCH/FP services has enabled the hospital to identify two threats to the financial sustainability of providing RH services: 1) the outpatient services are heavily under-priced and therefore the hospital is unable to recover costs (overall cost recovery level stands at 36.7%), and 2) there is limited scope for reducing the costs of providing FP, VCT, and PMTCT services and external constraints, such as poverty levels of clients and competition from lower priced services in the market, limit ability to collect revenues from these services. Therefore these services will remain dependent upon donor or other third party financing.

The cost analysis of these services will enable the hospital management to consider reviewing current fees upward for maternity services with a view to minimizing losses which currently stand at almost 20%. Since the hospital is accredited by the Kenya National Health Insurance Fund (NHIF) to deliver a basic package of care including maternal and child health services, management can use the information to negotiate contracts with the fund, as the NHIF will reimburse health providers on the basis of evidence-based average costs. It is anticipated that this arrangement would reduce donor dependency and improve financial sustainability of these services. In addition, this information will be used in discussions with donors regarding their level of support for reproductive health services at Chogoria Hospital.

The following service specific recommendations were made:

*Maternity Services:* Explore increasing the daily bed charges for normal delivery and postabortion care to generate larger net revenues to help offset the losses incurred for outpatient reproductive health services. Use these average service costs per patient per day to negotiate for rebates per day in contracts with NHIF for maternity services.

*MCH/FP Services:* For all outpatient services consider small increases in visit fees from the current KSh. 25. While the revenue gains will be minimal these additional revenues can help offset the cost of FP commodities and HIV tests which are now given free of charge. Chogoria should also discuss with supporters of FP, VCT and PMTCT the current cost of providing these services and whether they are willing to commit to payments that will cover more than the variable cost of service provision. This is needed to make these services less of a financial drain on the institution.

## V. DISSEMINATION

Chogoria Hospital will share the results of this study with the Christian Health Association of Kenya (CHAK). In addition, a meeting to assess the interest of CHAK in replicating the study with other member organizations will be sought. If there is interest by CHAK, FRONTIERS can provide technical assistance.

## VI. CAPACITY BUILDING

As a result of participating in this study, the local principal investigator, Moses Mokuu, has gained experience in the following areas: how to collect data on provider time use, the application of cost allocation rules for shared resources, the importance of distinguishing between fixed vs. variable costs, and the use of the production process approach to estimate the cost of inpatient and outpatient services. He is currently seeking opportunities to apply these skills to other services within Chogoria Hospital or with other Christian Health Association of Kenya facilities.



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## Annex 1: Summary of Resource Requirements, Data Sources, and Collection Methods

Resources	Physical resource measurement	Data collection technique	Unit valuation	Valuation Data Sources	Allocation Rule Used to Assign Cost to Specific Services
Health care staff	Amount of health care staff time spent in different activities	Observation	Add salary, overtime payments and staff benefits and compute cost per minute	Payroll records review	Within inpatient area, allocated proportional to patient days. Within outpatient area, direct observation to service then proportional to visits for 1 <sup>st</sup> vs. follow-up
Support staff	Amount of staff time spent working in each department/clinic	Support staff Interviews	Add salary, overtime payments and staff benefits	Payroll records review	Within inpatient area, allocated proportional to patient days. Within outpatient area, direct observation to service then proportional to visits for 1 <sup>st</sup> vs. follow-up
Drugs and supplies (materials)	Quantity of supplies consumed by each department	Provider interviews and desk review	Market or government supplied prices	Review of administrative records kept by stores/pharmacy	Within inpatient area, allocated proportional to patient days. Within outpatient area, proportional to visits within service category.
Equipment	Number of items in the inventory by department	Records review / inventory	Add monthly depreciation value (using replacement cost) to maintenance	Review of administrative records	Within inpatient area, allocated proportional to patient days. Within outpatient area, proportional to total visits
Utilities	Quantity or value consumed by each department using an appropriate allocation unit	Records review	Monthly payments made to utility companies	Review of administrative records	Within inpatient area, allocated proportional to patient days.  Within outpatient area, proportional to total visits
Transport	Number of journeys and KMs undertaken per month	Records review	Monthly depreciation value (using replacement cost) plus maintenance, plus staff and fuel costs	Review of administrative records (transport department)	Within inpatient area, allocated proportional to patient days.  Within outpatient area, proportional to total visits
Maintenance of buildings, plant, equipment	Value consumed by each clinic/ward using an appropriate allocation unit	Records review / Observation	Monthly payments made to contractors	Review of administrative records	Within inpatient area, allocated proportional to patient days.  Within outpatient area, proportional to total visits
Buildings	Number of buildings and land area occupied by clinic/ward	Records review / Observation	Monthly depreciation value (using replacement cost) plus maintenance costs	Review of administrative records	Within inpatient area, allocated proportional to patient days.  Within outpatient area, proportional to total visits

## Annex 2: Summary of Cost Calculations

	Cost category	Maternity services			MCH/FP Services					
		Normal	Cesarean	PAC	FP-1st visits	FP-Revisits	ANC-1st vists	ANC- Revisits	VCT-1st visits	PMTCT
<b>A</b>	<b>FIXED COSTS (FC)</b>									
1	<b>Personnel time:</b>									
	Doctors #4	741,928	367,053	9,628	139,409	235,579	49,956	134,360	-	-
	Clinical Officers #2	61,881	30,614	803	-	-	-	-	-	-
	Registered nurses #10	393,976	194,911	5,112	111,754	188,846	81,473	219,127	300,600	300,600
	Enrolled Nurses #3	107,398	53,133	1,394	117,843	199,136	1,995	5,365	1,963	981
	Paramedical Workers # 5	72,133	35,686	936	195,759	330,802	3,439	9,249	3,625	1,813
	Patient Attendants #5	125,356	62,017	1,627	39,259	66,341	650	1,750	600	300
	Counsellors #2	-	-	-	76,938	130,013	1,379	3,710	144,611	67,429
	<b>Sub-total -labor cost</b>	<b>1,502,672</b>	<b>743,414</b>	<b>19,499</b>	<b>680,960</b>	<b>1,150,718</b>	<b>138,892</b>	<b>373,561</b>	<b>451,399</b>	<b>371,123</b>
2	<b>Equipment</b>	<b>1,378,863</b>	<b>682,163</b>	<b>17,893</b>	<b>15,933</b>	<b>26,924</b>	<b>10,644</b>	<b>28,627</b>	<b>25,291</b>	<b>14,229</b>
	<b>Total Fixed Costs (TFC)</b>	<b>2,881,535</b>	<b>1,425,577</b>	<b>37,392</b>	<b>696,893</b>	<b>1,177,643</b>	<b>149,536</b>	<b>402,189</b>	<b>476,690</b>	<b>385,352</b>
<b>B</b>	<b>VARIABLE COSTS (VC)</b>									
3	Drugs	4,318,202	2,136,337	56,035	-	-	96,489	259,515	-	2,071
4	Lab. investigations	201,837	99,855	2,619	9,456	15,980	11,581	31,148	57,646	45,954
5	Imaging/X-ray	8,180	4,047	106	147	248	7,823	21,040	-	-
6	FP Commodities	-	-	-	52,759	258,181	-	-	-	-
	<b>Total-variable Costs (TVC)</b>	<b>4,528,219</b>	<b>2,240,238</b>	<b>58,760</b>	<b>62,363</b>	<b>274,409</b>	<b>115,893</b>	<b>311,704</b>	<b>57,646</b>	<b>48,025</b>
<b>C</b>	<b>JOINT COSTS (JC)</b>									
7	Pharmacy Department	-	-	-	-	-	-	-	-	-
8	Laboratory Department	-	-	-	-	-	-	-	-	-
9	Kitchen	490,339	242,585	6,363	-	-	-	-	-	-
10	Maintenance& repairs	138,514	68,527	1,797	1,156	1,953	1,123	3,021	576	461
11	Fuel, Electricity, water	153,306	75,845	1,989	1,989	3,360	1,933	5,199	991	792
12	Vehicle running expenses	78,577	38,874	1,020	10,409	17,590	9,038	24,309	11,338	9,038
13	Cleaning materials & linen	49,999	24,736	649	6,623	11,192	5,751	15,468	7,214	5,751
14	Printing and stationary	126,941	62,801	1,647	16,816	28,416	14,601	39,271	18,316	14,601
15	Motor vehicle insurances	14,035	6,944	182	1,859	3,142	1,614	4,342	2,025	1,614
16	Telephone & postage	50,503	24,985	655	6,690	11,305	5,809	15,624	7,287	5,809
17	Administration including security	250,187	123,774	3,247	3,245	5,484	3,154	8,484	1,616	1,293
18	Laundry including house keeping	2,386	1,181	31	-	-	-	-	-	-
19	X-ray/diagnostic imaging	-	-	-	-	-	-	-	-	-
	<b>Total Joint Costs (TJC)</b>	<b>1,354,787</b>	<b>670,252</b>	<b>17,580</b>	<b>48,787</b>	<b>82,442</b>	<b>43,025</b>	<b>115,719</b>	<b>49,363</b>	<b>39,360</b>
	<b>GRANT Total(FC+VC+JC)</b>	<b>8,764,542</b>	<b>4,336,067</b>	<b>113,733</b>	<b>808,043</b>	<b>1,534,494</b>	<b>308,454</b>	<b>829,611</b>	<b>583,699</b>	<b>472,737</b>
<b>SUMMARY</b>										
	No. of bed days(annual)	6,165	3,050	80						
	No. of Visits (annual)				1,625	2,746	1,411	3,795	1,770	1,411
	Current per diem/visit fee	800	1,400	1,098	25	25	25	25	25	-